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## वाल्ट (कोष कक्ष) के दरवाजे

भाग 1 विशिष्टि

( तीसरा पुनरीक्षण )

## Vault (Strong Room) Doors

Part 1 Specification

( Third Revision )

ICS 13.310

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## FOREWORD

This Indian Standard (Part 1) (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Security Equipment Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1985 and revised in 2014. In this revision the following major changes have been made:

- a) For widening the scope of standard to cover smaller sizes Note-1 added under Table 1.
- b) For making it unambiguous by removing descriptive words like “strong” from clauses 8.3.1 and 8.3.2.2.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test, should be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# *Indian Standard*

## VAULT (STRONG ROOM) DOORS

### PART 1 SPECIFICATION

( Third Revision )

#### 1 SCOPE

This standard (Part 1) covers the requirements for construction and performance of vault (Strong room) door affording protection against burglary attacks and fire.

#### 2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards given in Annex A.

#### 3 TERMINOLOGY

For the purpose of this standard the following definition shall apply.

**3.1 Vault (Strong Room) Doors** — A device standing in an upright position with doors swinging or receding at the sides and provided with vestibule, substantial hinges and locking mechanism capable of withstanding the stresses and exposure to fire, extraneous force and attack, to which doors are subjected to in service.

#### 4 TYPES

##### 4.1 Vault Main Doors

Vault doors of this type are used for special purposes in defense, banks, jewelry storage and other security organizations.

##### 4.2 Vault Emergency Doors

Vault doors of this type are used in vaults for emergency entry and exit.

#### 5 DIMENSIONS

Dimensions of vault (Strong room) doors shall be as specified in Table 1 read with Fig. 1.

#### 6 MATERIAL

Materials for manufacture of vault door specified in Table 2 are for general guidance only. The critical

quality parameters of the materials used for the components shall be declared by the manufacturer at the time of type approval and records of details of material shall be maintained for conformity during routine production.

#### 7 CLASSIFICATION

Vault doors shall be classified as under:

<i>Class</i>	<i>Classification Code</i>	<i>Burglary Resisting Capacity min</i>	<i>Fire Resisting Capacity min</i>
(1)	(2)	(3)	(4)
C	TRTL 15-FR 30	15	30
B	TRTL 30-FR 30	30	30
A	TRTL 60	60	—
AA	TRTL 120	120	—
AAA	TRTL 180	180	—
NOTE — Time specified for each test in minutes is minimum.			

#### 8 CONSTRUCTION AND GENERAL REQUIREMENTS

##### 8.1 Doors (see Fig. 1)

###### 8.1.1 Ventilating Grill Gate (Inside)

Ventilating grill gate shall be made out of mild steel angles, plates or channels with mild steel rods welded in a rigid frame. The mild steel rods shall be welded on the underside of the frame with the holes drilled in the upper and lower horizontal member of the shutter frame after passing through the flats or channels at the center of the shutter frame. The grill gate shall be hinged in strong room doors frame such that it opens inside, either from left to right or from right to left as required by the user.

**8.1.1.1** An unpickable dual control locking device, capable of being operated from both the sides of the door shall be fitted in the grill gate.

###### 8.1.2 Main Door (Outside)

The main door shall consist of outer and inner mild steel plates up to 20 mm thick, strongly rimmed and

welded to form a single structure and tightly enclosing a solid slab of high speed drill-resisting and oxyacetylene torch-resisting material. Alternatively the entire door may be made up of several alternate layers of hardened mild steel plates, carbon steel plates and oxyacetylene resisting non-ferrous metal plates.

**8.1.2.1** The doors shall have smooth finish. In the closed position, the gap at any place between the door edge and the frame shall not be more than 3mm. However this gap in the supplied product shall not be more than the minimum measured gap across samples submitted for type approval. In the lock position, the door after clenching (where applicable) shall not have any play in the direction in which the door opens (*see also 8.2.2 and 8.2.3*).

## 8.2 Doors Frame

The door frame and vestibule section shall be of channel type to grip the concrete wall, either in one piece or built up. Alternatively, for Class C and Class B doors, minimum three angle brackets of nominal minimum size 100 mm × 100 mm × 10 mm may be provided on each side of the door frame to grip the concrete wall.

### 8.2.1 Rebate of the Door Frame

The rebate of the door frame shall be formed by mild steel sections as specified in Table 2. The vertical rebates shall be riveted or welded with the side members of the door frame and shall conform to dimensions specified in Table 1. Similarly, top rebate shall be welded/riveted with the top member. The entire door frame shall be so constructed that it can withstand any shock or impact due to force, fire, fall and burglar attacks that are likely to be encountered during service.

### 8.2.2 Compression Mechanism

A continuous resilient packing shall be incorporated in the frame and a compression mechanism shall be provided for clenching the door tight against this packing in doors of Classes B, A, AA and AAA. Protection is thus provided against the admission of flood water or liquid explosives.

### 8.2.3 Crane Hinge Mechanism

In case of doors of Class AA and Class AAA, the door may be hung on specially designed sturdy crane hinge of double bearing type, provided with thrust and ball bearings rendering the movement of the door well balanced and easy so that very little effort is required for opening and closing the door. This construction also permits movement of the door perpendicular to the frame and since the crane hinge is also capable of adjustment both horizontally and vertically, it ensures a much closer fit of the door into the frame. Clenching is achieved by a special point to clenching mechanism operated through a worm and worm wheel. The hinges shall have arrangement for lubrication.

## 8.3 Locking Mechanism

### 8.3.1 Lock Case

It shall be solid flange on all the four sides built up of mild steel angles or flats/plates of thickness not less than 5 mm, firmly secured to the door slab making the door slab and lock case integral. The flanges shall provide firm bearings for the sliding bolts which pass through them and shall form a joint construction behind the rebates when the door is locked, thus interlocking the door shutters and frame.

### 8.3.2 Bolt Work

**8.3.2.1** The number of bolts and their minimum dimensions shall be as specified in Table 1.

#### 8.3.2.2 Construction

The bolt work shall be mounted on a secure base such as the door slab and not on the lock case cover. A centrally situated steel eccentric shaft or lever control bolt or any other mechanism shall actuate the cross straps (rigidly fixed to the shooting bolt carrier strap on either side), which transmit motion to the shooting bolts on all four sides as the case may be.

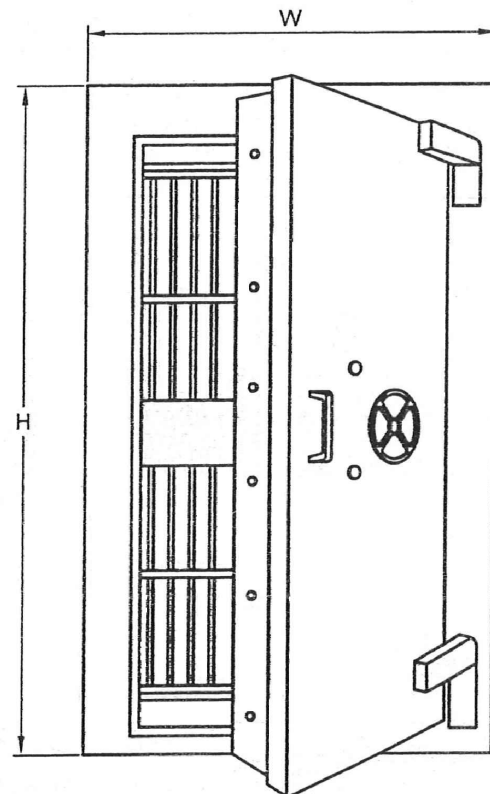


FIG. 1 DIMENSIONS FOR VAULT  
(STRONG ROOM) DOORS

**Table 1 Dimensions of Vault (Strong Room) Doors and their components**  
( Fig. 1, *Clauses 5, 8.2.1 and 8.3.2.1* )

Sl No.	Particulars	Main Doors						Emergency Doors			
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	(2)	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class
i)	Door type	C	B	A	AA	AAA	C	B	A	AA	AAA
ii)	Recommended Overall dimensions of vault doors										
	a) Height H 1) <i>Max</i>	2 250	2 300	2 350	2 350	2 450	1 200	1 200	1 200	1 200	1 300
	2) <i>Min</i>	2 100	2 100	2 100	2 100	2 250	900	900	900	900	1 000
	b) width W 1) <i>Max</i>	1 300	1 400	1 450	1 450	1 550	1 250	1 250	1 250	1 250	1 350
	2) <i>Min</i>	1 150	1 250	1 250	1 250	1 350	1 100	1 100	1 100	1 100	1 200
iii)	Recommended Inside dimensions or clear opening when door shutters are swung open at 180°										
	a) Height H, <i>Min</i>	1 950	1 950	1 950	1 950	1 950	600	600	600	600	600
	b) Width W, <i>Min</i>	900	900	900	900	900	750	750	750	750	750
iv)	a) Thickness of door frame angle, channel or section made out of M.S. plates, if built up to form a channel, <i>Min</i>	10	10	19	19	19	10	10	19	19	19
	b) Thickness of door frame, if fabricated from single plate to form channel/single or multi-bend section, <i>Min</i>	10	10	10	10	10	10	10	10	10	10
v)	Dimension of the rebate coming under shear										
vi)	Thickness of grill gate angles or section made out of M.S. plates, <i>Min</i>	5	5	5	5	5	5	5	5	5	5
vii)	Diameter of grill gate rods, <i>Min</i>	19	19	19	19	19	19	19	19	19	19
viii)	Pitch of grill gate rods										
ix)	Thickness of doors slab, thickness over rebates, <i>Min</i>	12	29	65	90	150	12	29	65	90	150
x)	Thickness of the door over lock, <i>Min</i>	40	50	75	100	160	40	50	75	100	160
xi)	Thickness of drill and oxyacetylene torch resisting layer (excluding mild steel plates), <i>Min</i>	10	20	45	70	120	10	20	45	70	120
xii)	Wall thickness (recommendation)	305-380	305-380	305-450	305-450	450-610	305-380	305-380	305-450	305-450	450-610
xiii)	Number of locks, <i>Min</i>	2	2	2	2	2	2	2	2	2	2
xiv)	Number of shooting bolts on hinge side, <i>Min</i>	6	6	6	6	6	3	3	3	3	2

Table 1 (Concluded)

Sl No.	Particulars	Main Doors					Emergency Doors				
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	(2)										
xv)	Number of shooting bolts on opposite side, <i>Min</i>	6	6	6	6	6	3	3	3	3	2
xvi)	Number of shooting bolts at top, <i>Min</i>	—	—	2	2	2	—	—	—	—	1
xvii)	Number of shooting bolts at bottom, <i>Min</i>	—	—	2	2	2	—	—	—	—	1
xviii)	Cross sectional area per shooting bolt, Minimum (mm <sup>2</sup> ) with 25 mm as Minimum Nominal dimension in any direction	1 134	1 134	1 963	1 963	3 318	1 134	1 134	1 963	1 963	3 318
xix)	Depth of engagement of shooting	15	15	15	15	20	15	15	15	15	20

## NOTES

1 For any class of door, any other size having vertical and/or horizontal dimensions less than that of type tested door and complying with all other design parameters (Sr No iv to xix of Table 1) of the type tested door of the size outlined in table 1 for that particular class of door, which had passed the tests for the relevant class of door as outlined in IS 11188 (Part 2) and IS 11188 (Part 3) may also be covered under the scope of this Standard. However, shape of the door shall remain rectangular or square only.

2 Sl. No. iv), vi), vii), ix), x), xi) and xviii) *Min* means nominal and tolerances are as per relevant Indian Standard.

**8.3.2.3** For convenient operation of the bolt work mechanism, square or round bearing pillars shall be provided for top sliding arms.

## 8.4 Locks

**8.4.1** The shooting bolt mechanism shall be controlled by two 8 levers (minimum) high precision-dual control-unpickable special key locks.

**8.4.2** The lock shall be provided with key made of stainless steel or any other metal/alloy having noncorrosive properties and should meet the requirement of 20 000 cycle test at the rate of 20 to 30 operations/min. The keys shall be double bitted for Classes A, AA and AAA doors and single bitted type for Classes C and B with detachable key bit where necessary. Alternatively, one or more four wheel keyless combination locks capable of 100 million changes of combination may be provided, if required by the purchaser. Mechanical combination lock may be fitted with dial check lock to freeze the movement of the dial.

**Table 2 Material for Manufacturer of Components of Vault Doors**  
( Clause 6 and 8.2.1 )

Sl. No.	Part	Materials
(1)	(2)	(3)
i)	Doors, door frame, bolt work, grill gate, hinge and other mild steel components	Any grade of steel having tensile strength of 270 MPa minimum [see IS 513 (Part 1), IS 513 (Part 2), IS 1570 (Part 5), IS 1079, IS 2062 and IS 9550)]
ii)	Door fittings	Mild steel with powder coating/stainless steel/Acrylonitrile Butadiene Styrene ABS or any other material suitable for the purpose.
iii)	Oxyacetylene torch and drill resisting layer	Special oxyacetylene torch and drill resisting slab of suitable material or materials capable of withstanding burglarious attack with the help of oxyacetylene torch and H.S. drills.

**8.4.3** The lock shall be fixed with at least four bolts of 8 mm diameter such that any pressure applied on the bolts either directly or through the handle of the door, is not transmitted to the fixing screw of the lock or locks. All working parts of the lock shall have corrosion resistant properties capable of withstanding exposure for 72 h in standard salt spray test with 5 percent salt solution.

### 8.4.4 Time Lock

Although the provision of time lock is optional, the locking mechanism, shooting bolt mechanism and door construction shall be such as to facilitate providing and fixing time lock at any later date for doors of Classes A, AA and AAA for main doors. Provision for time lock is not mandatory in emergency door.

### 8.4.5 Automatic Relocking Device

An automatic relocking device shall be fitted in the door which, being always on guard shall come into operation, if a lock is dislodged by explosives or attacked by other means.

## 9 DOOR FITTINGS

### 9.1 Hinges

Strap hinges forged or gas cut from an integral plate of appropriate thickness shall be suitably bolted to the door shutter and the same shall be pivoted over pivot which shall be bolted to the door frame. The hinge pivot shall be such that the door moves without any appreciable friction or play and permit clear opening of the passage. The pivots shall have arrangement for lubrication.

#### 9.1.1 Adjusting Bolt

An adjusting bolt shall be provided to facilitate height adjustment of the door shutter which may get lowered in the door frame due to wear in the pivot. The adjusting bolt shall have a lock nut arrangement.

### 9.2 Handles

Handles shall be of metallic material painted or plastic/powder coated or with nickel or chrome plating.

### 9.3 Foot Bridge

In case of doors of Class A, AA and AAA, a hinged chequered steel foot-bridge shall be provided to facilitate the passage of trolleys, etc. into the vault. The foot-bridge shall be folded into the vestibule before the door is closed. It shall not be applicable to Emergency Door.

### 9.4 Vault Lighting Control

A control switch shall be fitted on the main door to automatically control the electric supply to the vault. It shall not be applicable to emergency door.

## 10 FINISH

**10.1** All dents, burrs and sharp edges shall be removed from the various components and they shall be thoroughly degreased and cleaned of rust and scale.

**10.2** The inside and outside surfaces of the vault door shall be painted or powder coated. In case of paint, an appropriate primer and undercoating shall be used in accordance to industry practices. The minimum overall thickness of the coatings shall be 50 µ for powder coating and 70 µ for liquid paint and cross hatch test shall be conducted to confirm the adhesion of coating in accordance with **10.3**.

### 10.3 Cross Hatch Test

- Make 6 parallel cut marks using sharp metal pointer and straight edge, through the painted/coated surface, so as to make the base surface visible through cut marks.



- b) Cut marks shall be minimum 20 mm long and at 2 mm distance from each other.
- c) Make 6 similar cut marks in the direction perpendicular to first set of cut marks, with same length and spacing.
- d) These 12 cut marks together shall make a pattern of 25 squares of 2 mm × 2 mm size, totally separated from each other.
- e) A good quality transparent adhesive tape not less than 20 mm width shall be stuck on the pattern, parallel to any one set of cut marks.
- f) To ensure continuous contact with paint/coat film, rub the tape firmly and remove air bubbles under the tape, if any.
- g) Within 60 to 120 s after sticking the tape, remove it by seizing free end of the tape and rapidly pulling it off at an angle close to 180°.
- h) Painting/coating quality is considered as acceptable, if no part of any 2 mm × 2 mm square of paint/coat comes off the surface due to pulling the tape.

**10.4** Alternatively the doors can be finished by cladding in stainless steel.

## 11 TEST AND CRITERIA FOR CONFORMITY

**11.1** For doors of Class B and Class C, three samples shall be tested as following:

Sample No.	Nature of Test	Relevant IS No.
1	Burglary resistance	IS 11188 (Part 2)
2	Fire endurance	IS 11188 (Part 3)
3	Fire-Hose-Stream-Reheat	IS 11188 (Part 3)

**11.1.1** For class A, AA and AAA, one sample shall be tested for burglary resistance only.

**11.2** The doors shall be considered to be conforming to the requirements of this standard if they successfully

complete the tests for a period as specified in col 3 and col 4 of informal table in 7.

**11.3** The test specified in 11.1 shall be considered as type test and shall be carried out for initial approval of the design or at any subsequent change in the design of the vault doors. These tests shall be carried out once in four years in such a manner that each class of door for which the manufacturer has obtained approval, is tested at least once in four years.

## 12 MARKING

All vault (Strong room) doors shall be marked with the manufacturers name or trade-mark, the words 'Vault (strong room) door', class of the door and the year of manufacture at the top horizontal surface of the lock case.

### 12.1 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be covered in the scope of this standard.

### 12.2 Marking on Keys

The keys shall be marked with an identification number which shall not be the same as the serial number of vault door.

## 13 INSTALLATION

The manufacturers shall provide full details for installation of the door to the purchaser. Relevant drawings for the wall opening shall also be provided to the purchaser's architects before the start of civil construction work. They shall also depute their mechanics, if required by the purchaser, to install the strong room doors.

## 14 INFORMATION TO BE SUPPLIED BY MANUFACTURER TO THE PURCHASER

Information to be supplied by manufacturer as per Fig. 2 to the purchaser.



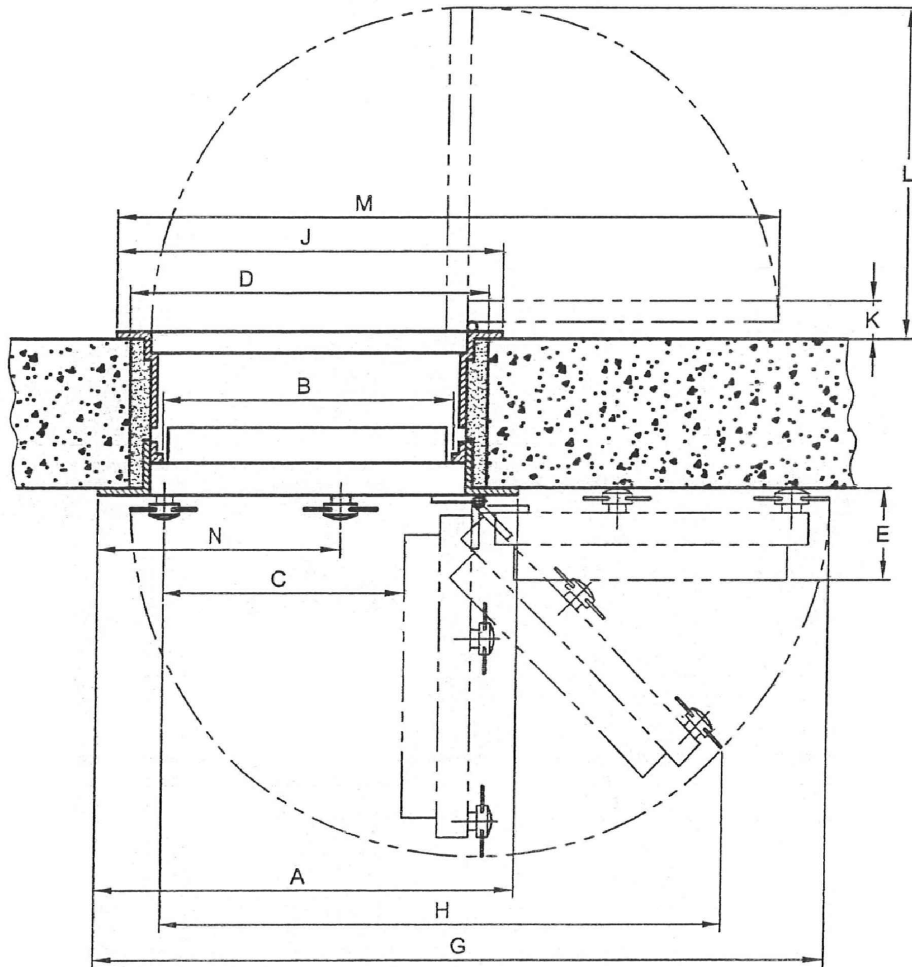


FIG. 2

Sl. No.	Description	Particulars
i)	Width over door frame, <i>A</i>	
ii)	Clear opening, door open at 180°, <i>B</i>	
iii)	Clear opening, door open at 90°, <i>C</i>	
iv)	Wall opening, <i>D</i>	
v)	Projection of door open at 180°, <i>E</i>	
vi)	Projection of door open at 90°, <i>F</i>	
vii)	Overall width of door and frame when door is open at 180°, <i>G</i>	
viii)	Minimum overall width of door and frame to give maximum clear opening, <i>H</i>	
ix)	Width over grill gate frame, <i>J</i>	
x)	Projection of grill gate open at 180°, <i>K</i>	
xi)	Projection of grill gate open at 90°, <i>L</i>	
xii)	Overall width of grill gate and frame when grill gate is open at 180°, <i>M</i>	
xiii)	Centre line of door opening to edge of frame, <i>N</i>	
xiv)	Shipping data: a) Height of case b) Width of case c) Depth of case d) Net weight e) Gross weight	

**ANNEX A**

( Clause 2 )

**LIST OF REFERRED INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
513 (Part 1) : 2016	Cold reduced carbon steel sheets and strips Part 1 Cold forming and drawing purpose ( <i>sixth revision</i> )	2062 : 2011	Hot rolled medium and high tensile structural steel Specification ( <i>seventh revision</i> )
513 (Part 2) : 2016	Cold reduced carbon steel sheets and strips Part 2 High Tensile and multi phase steel ( <i>sixth revision</i> )	9550 : 2001	Bright steel bars — Specification ( <i>first revision</i> )
1079 : 2017	Hot rolled carbon steel sheet and strip ( <i>seventh revision</i> )	11188 (Part 2) : 2021	Vault (strong room) doors Part 2 Test for burglary resistance ( <i>Third revision</i> )
1570 (Part 5) : 1985	Schedules for wrought steels Part 5 Stainless and heat-resisting steels ( <i>second revision</i> )	11188 (Part 3) : 1991	Vault (strong room) doors Part 3 Test for fire resistance ( <i>first revision</i> )

**ANNEX B***( Foreword )***COMMITTEE COMPOSITION**

Security Equipments Sectional Committee, MED 24

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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